

REMARKS

As a preliminary matter, Applicants' attorney thanks the Examiners for the thorough examination and the courtesies extended to Applicants' attorney during the recent interview with the Examiners. As acknowledged during the Examiner interview and as noted in the Examiner Interview Summary, Applicants have amended Claims 1, 8, 13, 14, and 20 without prejudice as to patentability, including the doctrine of equivalents. In the Final Official Action, the Examiner rejected Claims 1-20 under 35 U.S.C. §103 as being unpatentable over Javors (US 2002/0152097), Kathryn P. Glass (Incentive-Based Physician Compensation Models, July 1999), in view of Khorasani et al (6,029,138). Applicants respectfully disagree.

Javors, Glass et al., and Khorasani et al. Each Fails To Recognize The Problems Addressed By Applicants Claimed Invention

As an initial matter, neither Javors, Glass et al., nor Khorasani et al. even recognize the problems, which Applicants' claimed invention is directed to solving. The Supreme Court in the famous case of Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U.S. 45 (1923) (as requested by the Supervisory Patent Examiner, a copy of the case is enclosed), has long acknowledged that recognition of a problem not previously recognized by others is part of the invention, and, Applicants submit is an indicator of nonobviousness of an invention. Accordingly, as set forth extensively in the "Background" section of the instant application, Applicants have recognized that previous methods of managing healthcare practice groups have numerous disadvantages and have been largely unsuccessful in the climate and times of the instant application. For example, as set forth in the "Background" section of the present application, Applicants recognized that, in healthcare practice group management, such as a plurality of physicians in a practice group, managing the practice group effectively with respect to ancillary medical costs can be the difference between losing money and not. Applicants also recognized that the existing healthcare system will be difficult or impossible to overhaul, and Applicants have recognized a novel and nonobvious method of consulting with healthcare practice groups to thereby reduce the risk that these groups lose money. As a result, those within the group, such as physicians, can more effectively manage their healthcare practice. Applicants, however, have now provided an elegant solution to these problems. Such problem recognition and elegant solution are not found in the cited art, alone or in combination.

In contrast, as acknowledged during the Examiner interview, the purpose of Javors, for example, is to provide a whole new healthcare management model. It specifically talks about the problems with the current healthcare model. Although overhauling the current healthcare model may have some merits, such overhauling is not the purpose of the present claimed invention, and such overhauling entails significant political, financial, economical, and other types of disadvantages. Also, unlike the present claimed invention, Javors clearly fails to recognize the problems with current management of healthcare practice as recognized by Applicant, fails to recognize how to provide incentives to those within the practice group as claimed, and clearly fails to recognize such an elegant solutions to enhance managing such healthcare practice groups as set forth in the instant application.

Glass et al. describes a physician productivity-influencing model to increase the number of patients seen by a physician. Accordingly, Glass simply is not directed to collecting fees for enhancing management of a plurality of physicians or an insurance network. For example, Glass first describes compensation methods utilized at progressive phases of capitation, namely Introductory, Transitional, and Substantial. Each of these phases emphasizes productivity, e.g., Introductory--“[t]he more procedures performed and patients seen, the more physicians are paid,” (see paragraph 3), Transitional--“[r]ewards are structured mainly around productivity” (see paragraph 11), Substantial--“[a]s physicians become more efficient, they must be motivated to care for larger populations in order to keep their productivity at appropriate levels” (see paragraph 14). Again, with all respect, Applicants claimed invention is not directed to productivity of the physicians in a practice group.

Also, during the recent interview with the Examiners, the Examiners suggested that although ancillary medical costs per se were not disclosed in Glass, the terms “ancillary services” (paragraph 6) and “ancillary utilization” (paragraph 30) were used. Applicants agree and appreciate the Examiners pointing this out to Applicants, but Applicants respectfully submit that Glass still fails to suggest collective fees and still fails to recognize the problem associated with ancillary medical costs as identified by Applicants. For example, the first use of “ancillary services” in paragraph 6 of Glass is in the context of describing a Transitional phase of a practice where the practice begins to supplement the fee-for-service revenues in the Introductory phase with prepaid revenues. In such a Transitional phase (recognizing that rewards are still structured mainly around productivity in this phase), among a plurality of new objectives, including larger

patient panels, increased patient satisfaction, a greater focus on preventative care, and fewer out-of-group referrals, Glass dismissively suggests that the practice would have an objective of “decreased use of ancillary services[,]” but says no more. From the preceding sentence(s) and the following sentence(s)/paragraph(s) surrounding this quote, we can glean that this is because the groups are inefficient, and this lack of efficiency causes activities that were once profitable to be loss leaders. Hence, it seems to suggest that use of ancillary services is inefficient, and it is unclear as to whether it is the cost of these services within a practice group, referrals to other companies that perform ancillary services, or the time involved causes the physician to be less productive. This description then provides two suggested incentive plans for the practice during this phase, namely (1) align a compensation formula for the physicians with the reimbursement system to reward “productivity for fee-for-service plan patients” and “efficiency for capitated plan patients” (now thereby shedding light on the new objectives being directed to efficiency under capitation plans--which Applicants submit is really how many patients do you see, not refer patients out to other groups, and not using ancillary services, which are all productivity measurements); and (2) salary plus production incentive where “rewards are structured mainly around productivity,” and “benchmarking productivity is critical for maintaining group standards while transitioning to higher levels of capitation.” Hence, it is clear that this obfuscated reference to “decreased use of ancillary services” as one among many objectives is directed to increasing efficiency and productivity and not to reduce ancillary medical costs per se, and especially not to a recognition of reducing ancillary medical costs, collecting fees or distributing savings from these reduced costs among the physicians.

The second use of “ancillary utilization” in paragraph 30 of Glass is in context of describing the Substantial phase. In the Substantial phase (over 50% capitation), Glass suggests that “productivity benchmarks are often overlooked at this stage.” As physicians become more efficient, productivity needs to be maintained (again indicating productivity is an emphasis in the Transitional phase, as well as the Glass article as a whole) by production incentives. In this phase, Glass suggests that physicians can be paid a straight salary (but it is hard to maintain productivity) (see paragraph 15) or a salary plus incentive component can be implemented (see paragraph 17).

The Glass article then launches into a description of challenges in this Substantial phase and followed by a description of productivity and performance measures. Performance-based

incentives include patient satisfaction, utilization and cost of service, quality of care, administrative duties and collegiality, teamwork, peer reviews, and academic teaching and research (see paragraph 28). Within the utilization and cost service, there are wide varieties of measurement, such as expenditures per RVU, cost per encounter, PMPM utilization, use of physician extenders, average length of stay, as well as the second instance of use by Glass of “ancillary utilization” (see paragraph 30), but again says no more. This second instance, likewise, is totally unrelated to the present claimed invention and still makes the patient seem like only a unit on a production assembly line. Glass fails to teach or suggest the elegant and effective solution proposed by Applicants for beneficial and more effective healthcare practice group management so that physicians, insurance companies, and patients all benefit.

Then, Glass transitions into describing their proposed “RVU Physician Compensation Model” using relative value units (RVUs) where “clinical productivity is measured in RVUs” (paragraph 41) and never references or uses the “ancillary services” or “ancillary utilization” again. The RVU model also uses Medicare’s Resource-Based Relative Value Scale (RBRVS) because work and practice expense components are split by procedure (paragraph 41). So, RVUs are explained in terms of RVU-work and RVU-PE (see paragraphs 44-46). Accordingly, if RVU is a measurement of “productivity,” then RVU-work and RVU-PE clearly are likewise measurements of productivity.

For example, Glass even states that RVU-PE “is derived from the baseline projected clinical productivity” (paragraph 45). As for RVU-work, Glass states that this is a combination of clinical activity (again based on productivity) and non-clinical activity. Glass suggests that because non-clinical activity is not normally measured in terms of RVUs, RVU-work proxies (also tied to productivity) are developed to establish baseline or budgeted RVU-work. So, RVU-work is a combination of the RVU based on clinical activity and RVU proxies budgeted as measurements for non-clinical activity--again both still associated with productivity. Then, it should be apparent that reference in paragraph 47 of Glass to a compensation model in terms of Actual RVU-work, Budgeted RVU-work, Actual PE, Budgeted PE, Actual RVU-PE, and Budgeted RVU-PE are all associated with physician productivity.

Therefore, when performance is determined, measured, or budgeted in terms of RVUs, it should be clear that this performance is associated with productivity of the physician. As such,

Applicants still submit that Glass fails to recognize the problem identified by Applicants related ancillary costs, collecting fees, creating incentive pools, and modifying physician behavior to address the ancillary medical costs.

Khorasani et al. further fails to recognize the problems addressed by Applicants and fails to provide any solutions for problems (which, of course, it fails to recognize). Khorasani et al. is directed to solving problems related to diagnosing patient symptoms, namely which diagnostic and therapeutic tests for a physician to select to use on a patient based on results of similar tests used on other patients. In other words, the problems recognized by Khorasani et al. relate to the selection of inappropriate or ineffective tests on patients "by sparing patients from unnecessary procedures which may delay time to reach a correct diagnosis or may subject the patient to unnecessary risks." (Col. 1, lines 22-24).

As such, Applicants respectfully submit that to somehow use three completely different patent documents (a published patent application, a published scientific article, and an issued patent), which each fails to recognize the problems which Applicants both recognize and address and which each have completely different purposes from each other and from the present claimed invention, is surprising and awkward and would not be what one skilled in the art would look to do to somehow arrive at the present claimed invention. Perhaps it is bit like mixing apples and oranges in hopes of obtaining grapes. The three cited patent documents have nothing to do with each other. The problems addressed and purposes of Javors, Glass et al. and Khorasani et al. are completely different, the systems and methods of these patent documents are completely different, and the software/hardware technology concepts used to accomplish the purposes therein are completely different. So, Applicants respectfully submit that to somehow attempt to combine selected piecemeal portions of these three patent documents that fail to recognize the problems addressed by Applicants claimed invention or have related purposes to then somehow arrive at the claimed invention is improper. For this reason alone, Claims 1-20 define over the cited art.

II. No Proper Prima Facie Case of Obviousness Has Been Set Forth As Required

Nevertheless, to address each of Examiner's concerns more explicitly, in the Official Action (paragraphs 1-2), the Examiner has rejected Claims 1-20 under 35 U.S.C. § 103(a) as being unpatentable over Javors, in view of Glass et al., and further in view of Khorasani et al.

Applicants disagree. To establish a proper prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on the Applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); *see also* MPEP 706.02(J).

A. No suggestion or motivation to modify the references or combine reference teachings.

Applicants respectfully submit that the Examiner has failed to meet the first element of a prima facie case for obviousness. First, there is no suggestion or motivation, any of the cited patent documents themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. The Examiner has the burden of proffering a showing of this motivation to combine and has not met it here. No real support or evidence at all has been set forth by the Examiner.

Instead, in an improper fashion, the Examiner has merely read Applicants' disclosure to find the motivation and incentive within Applicants' disclosure and then attempted to combine piecemeal sections of Glass into Javors by saying that such a combination is justified by "the motivation of aligning incentives with the goals of the a healthcare practice and encouraging others to adopt new behaviors consistent with the group's strategic goals (See Paragraph 46 of Glass)". Notably, the Examiner totally disregards the basis for the incentives suggested in Glass (or what Glass teaches as a whole), namely "the more procedures performed and patients seen, the more physicians are paid" and "[a] selected percentage of the dollar value of production by each provider is the compensation component" (See Paragraph 3 of Glass). The RVU compensation model is based on productivity (throughput based on the number of patients seen by a physician---again the assembly line approach) and performance (budgeted level versus actual level of patient satisfaction, number of patients seen, etc.). So, in "proper" context, what Paragraph 46 of Glass is actually saying is that "[i]t is important to have physician leaders embrace the plan" (namely the RVU Compensation Plan) in order to align incentives in the RVU

Compensation Plan with productivity and performance "goals of the practice" to encourage others to adopt new behavior (namely productivity and performance behaviors) and to "buy into the new program" (RVU Compensation Plan). The teaching in Glass is to align productivity and performance goals of the RVU Compensation Plan for physician leaders and is not focused on problems associated with "ancillary medical costs" in a healthcare practice group. With all respect, and with this "proper" context in mind, the Examiner either has not properly understood this Glass teaching or ignores this teaching in an attempt to piecemeal some kind of "out of context" hindsight motivation. Clearly, Glass provides no motivation to combine with Javors and to set forth that "paying funds from the funded incentive pool to the healthcare practice participating in the insurance network when the ancillary medical costs of the plurality of physicians in the healthcare practice do not decrease to a preselected level over a preselected period of time" is well known in the art is simply wrong. As such, Applicants suggest that the Examiner's evidence of motivation is improper and non-existent.

Also, the existence of a gaping hole is the Examiner's attempt to piecemeal evidence using improper hindsight further is amplified by the admission that the combined teachings of Javors and Glass do not disclose "establishing a relationship between a healthcare consultation group and the healthcare practice participating in the insurance network to increase the plurality of physicians' profitability by reducing a risk of the healthcare practice not receiving a predetermined reimbursement amount for ancillary medical costs from the insurance network; modifying behavior of at least one of the plurality of physicians in the healthcare practice for management of the ancillary medical costs; and distributing predetermined percentages of savings attributed to the modifying behavior of the plurality of physicians' ancillary medical cost management." In other words, in addition to the "improper" context used by the Examiner as alleged evidence, significant elements of the claimed invention remain missing with the combined teachings. Applicants respectfully submit that such missing elements further highlights why someone skilled in the art, in fact, would have no motivation to combine Javors and Glass, especially absent Applicants teachings in the instant application. How would one skilled in the art even consider, let alone go about, finding such a motivation without the improper and insidious use of hindsight? Again, no "proper" evidence of combining Javors and Glass has been provided.

Further, again in yet another improper attempt to "create" evidence, the Examiner suggests that by looking to Khorasani with "the motivation of providing systems that either seek to change the physicians behavior or interfere with traditional practice routines which are often not adopted readily by physicians (See Khorasani, Col. 1, lines 36-40)" these significant missing elements from Claim 1 and not found in either Javors or Glass would be obvious to one skill in the art. With all respect, but to highlight the absurdity of such a combination and the clear lack of evidence for any motivation, Applicants believe it is important to remember that Javors as a whole teaches a new healthcare management model, and Glass as a whole teaches a physician compensation model that pays physicians based on number of patients seen (assembly line approach) and budgeted versus actual performance. Now, the Examiner suggests that these two patent documents (Javors and Glass) can somehow be combined with Khorasani et al. which as a whole teaches a computer system for decision support in the selection of diagnostic and therapeutic test and interventions for patients, namely for physicians ordering studies results of similar types of treatments used on patients in the past. Applicants respectfully submit that this awkward combination is just wrong. These totally disparate teachings of three different patent documents are somehow improperly being sewn together by selected piecemeal portions therefrom—the net effect is truly a Frankenstein result (namely scary and unrecognizable)—not the claimed invention with its elegant solution to addressing significant problems associated with ancillary medical costs.

More specifically, Khorasani et al. describes a computer system (a clinical information system) to order a study to be performed on a specified patient and indications for the study. "The received indications for the selected study are used to access a database of result codes for previous studies having the same indications, including studies performed on other patients. A result of the comparison of the selected study and specified indications to the result codes database is then sent to the ordering physician." (Col. 2, lines 14-22). Nevertheless, in view of these clear teachings in Khorasani et al., the Examiner takes portions of this patent document, namely lines (Col. 1, lines 36-40), out of context which refer to physicians' generally hesitancy to adopt and use clinical information systems (see Col. 1, lines 33-40 in context) to allege that this is some type of evidence or support for combining the teachings related to using diagnostic systems with a patent document that teaches a new healthcare model and a patent document that teaches increasing the number of patients seen by and performance measures of a physician to

increase there compensation. With all respect, again these lines in Khorasani are really no evidence. A discussion in a patent document (Khorasani) related to physician hesitancy to adopt the use of computer system to help analyze patient symptoms over traditional practice routines is not evidence of motivation of one skilled in the art to combine the teachings of Khorasani (symptom diagnostic system) with Javors (new healthcare management model) and Glass (plan to increase number of patients seen by and performance measures of a physician to increase compensation). Not only is there nothing explicit in the cited patent documents that would suggest the modification, there is also nothing implicit suggesting modifying the cited patents, as the teachings, knowledge of one of ordinary skill in the art, and nature of the problem to be solved, as a whole, would not suggest doing so to those of ordinary skill in the art as is required in MPEP 2143.01 and *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000).

Still further, even if the cited patent documents somehow could be combined or modified, this still is not sufficient to establish a *prima facie* obviousness unless the prior art also suggests the desirability of the combination. MPEP 2143.01. Not only is there no suggestion as to the desirability of the combination, discussed above, but also the combination would not in fact be desirable as the absurd result, when properly taken for the patent documents teach as a whole, would be a new healthcare model that increases compensation to physicians for number of patients seen and diagnoses symptoms of the patients seen. Clearly, this has nothing to do with the claimed invention and fails to provide an improved or enhanced method and system of collecting fees for managing a healthcare practice group.

Finally, even assuming a motivation and an ability to combine the patents, the MPEP 2143.01 states: "the fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness." Instead, the Examiner is required to provide evidence of such motivation and the desirability of making such a combination. And yet, nothing else has been shown by or set forth by the Examiner—other than the "out of context" citations to the patent documents. Therefore, for at least this reason, Applicants respectfully submit that a proper *prima facie* case of obviousness has not been set forth, that the present claimed invention is not obvious, and that Claims 1-20 define over the cited art.

B. No reasonable expectation of success.

The Examiner has also failed to meet the second element of a prima facie case for obviousness because there must be, and there is not in this present case, a reasonable expectation of success. Clearly, from the discussion above and a quick examination of the patent documents, one skilled in the art would realize that the modification of the prior art patent fails to produce the Applicants' present claimed invention, namely an improved or enhanced method of collecting fees for managing a healthcare practice such as a plurality of physicians. Instead, the combination, as suggested above, results in an absurd new model of a healthcare system that increases physician compensation based on increasing the number of patients seen and yet uses a computer system that assists in diagnosing patients- again not the claimed invention. Therefore, the second element of a prima facie case of obviousness has not been satisfied, and for this reason as well, the claimed invention is not obvious and defines over the cited art.

C. The cited patent documents fail to teach or suggest all the claim limitations.

Finally, the Applicants respectfully submit that the Examiner has failed to meet the third element of a prima facie case for obviousness, which requires all claimed features be taught or suggested. In this case, as set forth above, the Examiner takes the position that Javors, Glass, and Khorasani show all of the elements. Applicants submit that this simply is not true. First, with respect to Claim 1, the Examiner states that Javors discloses funding an incentive pool, but fails to disclose "paying funds from the funded incentive pool to the healthcare practice participating in the insurance network when the ancillary medical costs of the plurality of physicians in the healthcare practice do not decrease to a preselected level over a preselected period of time." (page 3 of Official Action). What the Examiner, however, does not say at this point with respect to Claim 1, for example, is that Javors also fails to disclose or suggest "establishing a relationship between a healthcare consultation group and the healthcare practice participating in the insurance network to increase the plurality of physicians' profitability by reducing a risk of the healthcare practice not receiving a predetermined reimbursement amount for ancillary medical costs from the insurance network," "modifying behavior of at least one of the plurality of physicians in the healthcare practice for management of ancillary medical costs," "paying funds from the funded incentive pool to the healthcare practice participating in the insurance network if the ancillary medical costs of the plurality of physicians in the healthcare practice do not decrease to a preselected level over a preselected period of time," and

"distributing predetermined percentages of savings attributed to the modifying behavior of the plurality of physicians ancillary medical cost management." So, the Examiner basically takes the position with respect to Claim 1 (as well as Claim 8) that the preamble and funding an incentive pool are disclosed in Javors and that only the preamble of Claim 13 is disclosed in Javors---that's it. All of these other elements are missing from Javors, and Applicant's submit that this shows what a "stretch" (improper hindsight) is being made to allege this combination.

Nevertheless, the Examiner then turns to Glass as an initial patent document in an awkward attempt to find these numerous missing pieces. Here, the Examiner alleges that Glass somehow shows "paying funds from the funded incentive pool to the healthcare practice participating in the insurance network if the ancillary medical costs of the plurality of physicians in the healthcare practice do not decrease to a preselected level over a preselected period of time"—yet this is not true. Glass, in fact, fails to teach or suggest such a step. The Examiner references pages 42-44, paragraphs 47-52 of Glass for this step, but this section of Glass describes a compensation plan to pay patients based on the number of patients seen (productivity) and performance (actual vs. budget)—again the assembly line concept. This fails to teach or suggest specifically "paying funds ...if the ancillary medical costs of the plurality of physicians in the healthcare practice do not decrease to a preselected level over a preselected period of time." This step is simply not taught in Glass and is clearly a missing element in the Examiner's analysis. The Examiner asserts that the fact that Glass pays a General Surgeons' base salary to be paid annually to read on "preselected time period" and then goes on to describe bonuses and incentives being paid to the General Surgeon. This analysis, however, misses the mark for several reasons: (1) again, the RVU compensation model described in Glass (see page 41, para. 41 of Glass) is paying physicians based on number of patients seen (productivity) and actual vs. budgetary performance (such as accurate medical records, patient satisfaction, etc.)—not even close to the model suggested in the instant application; (2) Glass fails to teach or suggest not paying if the ancillary medical costs do not decrease (Claims 1 and 8); and (3) Glass fails to teach or suggest distributing percentages of savings in an insurance network to the insurance network and the healthcare management consultation group if the ancillary medical costs decrease to a preselected level over a preselected time (Claim 13). Again, all of this is missing in Glass, and Applicants respectfully submit what the Examiner alleges is taught in Glass either is not what Applicants set forth in the Claims or simply is not taught in Glass.

The Examiner, then, acknowledges that numerous elements in Claims 1, 8, and 13 are still missing from both Javors and Glass (see page 4, para. 1 of Official Action). Applicants submit, however, that even more than what the Examiner acknowledges are still missing from such a combination. Nevertheless, these numerous missing elements are supposedly found in Khorasani. This, however, also is simply not true. Again, Khorasani describes a computer system to assist doctors in diagnosing symptoms/diseases/illnesses. To support the Examiner's assertions, the Examiner references Col. 5, lines 34-67 to Col. 6, line 26 which describes how a physician places an order on the computer system for a study in a decision support module. It guides the physician through what other studies show and what steps to take for treatment. This has nothing to do with collecting fees, fails to teach or suggest increasing profitability of a practice group by not receiving reimbursement amounts for ancillary medical costs from the insurance network, and distributing predetermined percentages of savings. In other words, this is simply not what is taught in the referenced Columns 5-6 of Khorasani and remains missing elements in Claims 1-20. Clearly, this demonstrates the missing elements from the claims in the Examiner's analysis. Accordingly, as a proper *prima facie* case of obviousness has not been shown, including lack of motivation, improper hindsight, and missing elements, Claims 1-20 have been shown to be nonobvious and define over the cited art.

Also, notably, Applicants submit that the Examiner also has failed to properly address and identify numerous elements in the dependent claims that are missing from Javors, Glass, and Khorasani. As such, the final action was improper and a *prima facie* U.S.C. § 103 rejection on these claims is improper as well. Therefore, for this reason as well, the claims are nonobvious and define over the cited art.

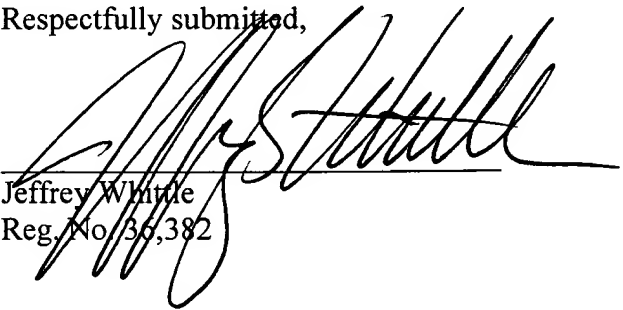
In commenting upon the references and in order to facilitate a better understanding of the differences that are expressed in the claims, certain details of distinction between the references and the present invention have been mentioned, even though such differences do not appear in all of the claims. It is not intended by mentioning any such unclaimed distinctions or making any amendments herein to create any implied limitations in the claims. Not all of the distinctions between the prior art and Applicant's present invention have been made by Applicant. For the foregoing reasons, Applicant reserves the right to submit additional evidence showing the distinctions between Applicant's invention to be novel and nonobvious in view of the prior art.

The foregoing remarks are intended to assist the Examiner in re-examining the application and in the course of explanation may employ shortened or more specific or variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope of the claims; the actual claim language should be considered in each case. Furthermore, the remarks are not to be considered to be exhaustive of the facets of the invention that render it patentable, being only examples of certain advantageous features and differences which Applicant's attorney chooses to mention at this time.

CONCLUSION

In view of the remarks set forth herein, Applicants respectfully submit that the application is in condition for allowance. Accordingly, the issuance of a Notice of Allowance in due course is respectfully requested.

Respectfully submitted,



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U.S. Supreme Court

EIBEL PROCESS CO. v. MINNESOTA & ONTARIO PAPER CO., 261 U.S. 45 (1923)

261 U.S. 45

EIBEL PROCESS CO.
v.
MINNESOTA & ONTARIO PAPER CO.
No. 178.

Argued Jan. 5-8, 1923.
Decided Feb. 19, 1923.

[261 U.S. 45, 46] This was a bill in equity charging the infringement of a patent and seeking an injunction, an accounting and damages. The patent, No. 845,224, issued to William Eibel, February 26, 1907. The application was filed August 22, 1906. The specifications describe the patent as for an improvement for Fourdrinier machines for paper making, and say that 'it has for its object to construct and arrange the machine whereby it may be run at a very much higher speed than heretofore and produce a more uniform sheet of paper which is strong, even and well formed.' The contention of the plaintiff, the petitioner here, is that his improvement was an important step in the art of paper making, and increased the daily product from 20 to 30 per cent.

The patent was held void by the District Court for the Western District of New York in the Case of Eibel Process Co. v. Remington-Martin Co., 226 Fed. 766 (1914). On appeal, the Circuit Court of Appeals for the Second Circuit reversed the decree of dismissal in the District Court, sustained the patent, and found infringement of claims Nos. 1, 2 and 3, but did not pass upon claims Nos. 7, 8 and 12. 234 Fed. 624, 148 C. C. A. 390 (1916). The bill in the present case was filed in the District Court for Maine, January 1, 1917. That court in 1920 held the patent valid and entered a decree of injunction and for damages. 267 [261 U.S. 45, 47] Fed. 847. On appeal, the Circuit Court of Appeals for the First Circuit reversed the decree and directed the dismissal of the bill, 274 Fed. 540 (1921). Because of the conflict in the two circuits, certiorari was granted to review the latter decree.

The Fourdrinier machine has for many years been well known and most widely used for making news print paper. Its main feature is an endless wire cloth sieve passed over a series of rolls at a constant speed. The sieve known as the 'wire' is woven with 60 or 70 meshes to the inch. It may be 70 feet or more in length, and is often more than 100 inches in width. Its working surface, with the total length of 70 feet, is about 30 feet; the rest being taken up in the return of the wire underneath. At what is called the 'breast roll,' at one end of the machine, there is discharged upon the wire, from a flow box or pond, a constant stream of papermaking stock of fibers of wood pulp mixed with from 135 to 200 times their weight of water of the consistency and fluidity of diluted milk. As this stream moves along the wire, the water drains through its meshes and the fibers are deposited thereon. The process is stimulated by a device to shake the wire with constant and rapid sidewise thrusts, forward and back, which insures the proper interlocking and felting of the stock as it progresses; the water continuing to drain from it. At the

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end of the surface length of the wire, the stock reaches what are called the 'couch rolls,' between which it is pressed, and then in the form of a sheet of uniformly distributed pulp, felted sufficiently to hold together, it leaves the wire and is carried through a series of rolls or calendars by which the sheet is pressed and dried, and from which it emerges to be rolled up as finished paper.

In the flow box, or 'pond,' where the stream of pulp stock is stored, there is a gate or door, forming the end of the flow box, called the 'slice,' by lifting which the stock [261 U.S. 45, 48] is given the opportunity to flow upon the wire. The stream thus issuing is given a width of the desired sheet of paper and a depth regulated by the height to which the slice is lifted. The stream on the wire is prevented from flowing off the sides by 'deckle straps,' which are thick rubber bands, resting on each side of the wire at each side of the pulp. Traveling with the wire, they form lateral walls confining the stock till it is too dry to flow. Between the breast roll, where the stream of liquid stock strikes the wire, and the couch rolls, at the end of the surface length of the wire, there is a series of parallel horizontal rolls supporting the wire, called table rolls, and 20 feet from the breast roll there are placed, under the wire and in contact with it, three suction boxes in succession, in which a partial vacuum is maintained, and through them is sucked out the greater part of the water remaining in the wet sheet of the pulp. Placed above the wire, and just beyond the first suction box, is what is called the 'dandy roll,' which is faced with wire cloth. Its office is to impress the upper surface of the forming sheet of paper and give it a texture similar to that which the lower surface of the paper has from its contact with the wire. It may also carry the design which is to give the watermark to the sheet, if such a mark is desired. Beyond this is a larger roll, called the 'guide roll,' arranged with an automatic device varying its axis, so as to keep the wire straight. From the guide roll the wire drops below the plane to the couch rolls, already referred to.

These machines are very large, some of them weighing more than 1,000, 000 pounds, and their cost will range as high as \$125,000. They are run night and day, in order that the capital invested in them may yield a proper return. Speed, which increases production, is therefore of the highest importance. Eibel's patent had for its avowed purpose of increase of this speed. [261 U.S. 45, 49] Eibel says in his specifications:

'My invention is embodied, essentially, in the first part or element of the machine having the Fourdrinier wire or paper-making wire, and consists in causing the stock to travel by gravity in the direction of movement of the making wire and approximately as fast as the making wire moves, thereby resulting in a 'gravity feed' for the machine. The stock may be and preferably is caused to travel more rapidly than the normal or usual speed of the making wire for a certain grade of stock, and means are provided for increasing the speed of the machine, so as to cause the making wire to move at a higher rate of speed than usual, being substantially equal to the speed of the rapidly moving stock. To accomplish this result in a simple manner, the breast roll end of the paper-making wire is maintained at a substantial elevation above the level, thereby providing a continuous downwardly moving paper-making wire, and the declination thus given to the wire is such that the stock is caused to travel by gravity in the direction of the movement of the wire and substantially as fast as the wire moves. The declination of the paper-making wire may be adjustable, or the speed of the wire may be variable, or both the declination and speed of the wire may be adjustable, in order that the velocity produced by gravity in the stock on the declining wire will approximately equal the speed of the wire. By this arrangement the speed of the machine may be increased to such an extent as to bring the speed of the making wire up to the maximum velocity of the rapidly moving stock and a strong, even, and wellformed sheet produced, which is more uniform than usual.'

Two figures accompany the specifications of the Eibel patent. Figure No. 1 shows the wire of the Fourdrinier machine in outline from the breast roll to the guide and couch rolls, with a screw device for

raising and lowering [261 U.S. 45, 50] the breast roll and wire from the horizontal. The outline shows an elevation of the breast roll and wire, so that the angle between the wire and the horizontal at the guide roll is about 4 per cent., which in a surface length of 30 feet would mean an elevation of 12 inches at the breast roll. The other figure, No. 2, shows a device for regulating the speed of the wire applied at the lower couch roll.

Again the patentee says:

'For the purpose of increasing the speed of the machine to the maximum I maintain the breast roll end of the making wire at a high elevation above the level, so that the stock travels by gravity much faster than the making wire ordinarily runs for a certain grade of stock, and I then increase the speed of the machine to such extent as to bring the rate of speed of the making wire up to the speed of the rapidly moving stock, and as a result the capacity of the machine is largely increased.

'I find in practice that by providing a gravity feed operating substantially as herein described, the stock runs smoothly and evenly without wavin or rippling, and the fibers are thereby permitted to settle with great uniformity as regards their distribution over the wire, so that the paper in addition to being well formed is very uniform. Furthermore, as the stock is moving with the paper-making wire, instead of being moved by the wire, or essentially by the wire, the formation of the paper will begin at the start, and will continue to the end of the travel of the stock with the wire.'

The claims in question are:

1. A Fourdrinier machine, having the breast roll end of the paper- making wire maintained at a substantial elevation above the level, whereby the stock is caused to travel by gravity, rapidly in the direction of movement of the wire, and at a speed approximately equal to the speed of the wire, substantially as described.
2. A Fourdrinier machine having the breast roll end of the paper- making wire maintained at a high elevation, [261 U.S. 45, 51] whereby the stock is caused to travel by gravity faster than the normal speed of the wire for a certain grade of stock, and having means for increasing the speed of the machine to cause the wire to travel at substantially the same rate of speed as the rapidly-moving stock, substantially as described.
3. A Fourdrinier machine having the paper-making wire declined from the breast roll to the guide roll, the breast roll end of the wire being maintained at a substantial elevation above the level, whereby the stock is caused to travel by gravity, rapidly, in the direction of movement of the wire and at a speed approximately equal to the speed of the wire, substantially as described.
7. A Fourdrinier machine having the paper-making wire declined from the breast roll to the guide roll, and the suction boxes supported at a corresponding declination, substantially as described.
8. A Fourdrinier machine having the paper-making wire declined from the breast roll to the guide roll, and the several suction boxes arranged at different elevations, substantially as described.
12. In a Fourdrinier machine, a downwardly moving paper-making wire, the declination and speed of which are so regulated that the velocity of the stock down the declining wire, caused by gravity, is so related to the velocity of the wire in the same direction, that waves and ripples on the stock are substantially avoided and the fibers deposited with substantial uniformity on the wire, substantially as

described.

Messrs. Frederick P. Fish and Harrison F. Lyman, both of Boston, Mass., for petitioner.

Mr. Amasa C. Paul, of Minneapolis, Minn., for respondent. [261 U.S. 45, 52]

Mr. Chief Justice TAFT, after stating the case as above, delivered the opinion of the Court.

The evidence in the case establishes that, before Eibel entered the field, continued high speeds in the wire of the Fourdrinier machine much beyond 500 feet a minute resulted in defective paper. Eibel concluded that this was due to the disturbance and ripples in the stock as it was forming at a point between the breast roll and the first suction box, caused by the fact that at that point the wire was traveling much faster than the stock, and that if at that point the speed of the flowing stock could be increased approximately to the speed of the wire, the disturbance and rippling in the stock would cease, and the defects would disappear from the paper product. Accordingly he proposed to add to the former speed of the stock by substantially tilting up the wire and giving the stock the added force of the down hill flow. He thought that as long as he could thus maintain equality of speed between stock and wire at the crucial point, and prevent the disturbance and rippling there, a further increase in the speed of the wire would not result in a defective product. He confirmed this by actual trial.

The first and most important question is whether this was a real discovery of merit. The Circuit Court of Appeals thought not. The prior art and the obvious application of the principle that water will run down hill in their opinion robbed it of novelty or discovery. The issue is one largely of evidence.

The plaintiff below introduced the patent and some evidence of infringement, and a single expert to explain the discovery and invention, and rested. Then the defendant brought in a mass of evidence to show prior discovery and use, to impeach the utility of plaintiff's alleged invention, and to demonstrate the indefiniteness of specification and claims. The fact that the adjudication of the [261 U.S. 45, 53] validity of the patent would impose a royalty on many of the paper manufacturers of the country who were not already licensees of the plaintiff led to the defendant's sending a circular letter to awaken the interest and secure the help of all so situated. This, as the record shows, had the effect to invoke offers of testimony on the critical points in the case from the unlicensed part of the trade. The plaintiff introduced a few witnesses in rebuttal as to particular details and the same expert as in chief. The plaintiff's case as presented on the record is largely the presumption of validity and novelty attaching to the patent and such evidence as comes from defendants' witnesses. A case that can be made out in all its elements by cross-examination of opposing witnesses is a strong case. Implication of facts and conditions falling from the mouths of witnesses when only collateral to the exact point of inquiry for which they are called is generally the most trustworthy evidence because the result of the natural, so to say, subconscious adherence to truth uninfluenced by a knowledge or perception of the bearing of the implication on the ultimate issue in the case.

A thorough examination of the whole voluminous record produces a satisfying conviction first that for years news print paper makers and manufacturers of paper-making machinery were engaged in seeking a method of increasing the speed of the news print machines, and that they had succeeded by improving the stock and by strengthening the parts in bringing the speed of the wire and the delivered paper up to between 500 and 600 feet a minute, but that when these high speeds were attained and maintained for any length of time, though they served to enable manufacturers to advertise such maximums, their continued and regular operation showed defects in the paper, which were only overcome by a reduction of speed to something less than 500 feet. As against advertisement, and the exuberant [261 U.S. 45, 54] memory of witnesses, the actual contemporaneous record of daily figures of production whenever

brought to light justifies this conclusion. A leading manufacturer, one of the most enthusiastic witnesses on the subject of speed before Eibel produced a memorandum of a visit he made in October, 1904, less than two years before Eibel's application, to see the operation of a machine he had manufactured which he called 'the banner installation of the world' and made an entry in his diary, 'Grand sight-475 feet.' There is the usual unconscious straining of memory without written record carried back 10 or 15 years, but the evidence on the whole is satisfying that the practical speed for the regular production of good news print paper never much exceeded that speed which had gratified the pride of this witness. A typical case is in that of machines made by Bagley & Sewall, large manufacturers of paper-making machines for the Laurentide Paper Company. The president of Bagley & Sewall testified that the speed of the machine was 552 feet a minute with satisfactory paper, and that he visited Laurentide in October, 1904, and counted the revolutions himself. He produced a letter from Mr. Chahoon, of the Laurentide Company, of about the same date confirming his statement of the count and the satisfactory product and an advertisement of Bagley & Sewall to the same effect of January, 1905. In rebuttal, a monthly record of the work of the machine is produced by the foreman at Laurentide for this same machine from January, 1905 to December, 1906, showing the speed to vary from a maximum of 518 in 1905, to 475 in 1908, with a general average of less than 500, and an explanation that the high speeds did not make a good product and were reduced. Our conclusion is confirmed, and indeed the importance of the issue of fact as to maximum speed before Eibel is minimized by the circumstance, uncontroverted, that the owners of these fastest machines, at once upon Eibel's publication [261 U.S. 45, 55] of his discovery, adopted his pitch and increased their product.

What Eibel tried to do was to enable the paper maker to go to 600 or 700 feet and above in speed and retain a good product. Did he do it? Eibel was the superintendent of a paper mill at Rhinelander, Wis. Before August, 1906, he raised the pitch of the wire from 2 or 3 inches to 12 inches, and greatly increased the speed, with a satisfactory product, and in that month he applied for a patent. The defendant's witnesses without exception refer to that disclosure as something that surprised and startled the paper-making trade. It spread, to use the expression of one witness, like wildfire. There were those who hesitated to take the venturesome step to give such an unheard-of pitch to the wire, and waited until others assumed the risk, but the evidence is overwhelming that within a short interval of a year or two all of the fast machines were run with wires at a pitch of 12 inches and that this pitch has been increased to 15 and 18, and even 24, inches; that the speed of the machines with satisfactory product has increased to 600, 650, and even 700 feet, with plans now even for 1,000 feet and that the makers of two-thirds of the print paper of the country are licensees of Eibel.

Defendant attempts to break the effect of this evidence by showing that five of the largest paper manufacturers who are licensees of Eibel are also shareholders in the Eibel Process Company, the plaintiff, and that they make 2,200 tons of the 5,000 tons of paper made daily in the United States. This circumstance seems to have had influence with the Circuit Court of Appeals. There are, however, 10 other paper-making companies, not shareholders, who are licensees and use the Eibel pitch, and whose aggregate production is 1,200 tons a day; and what is equally significant, 13 other companies have contributed [261 U.S. 45, 56] to a fund to help in resisting the establishment of the right of Eibel to claim a royalty for the use of this high or substantial pitch of the wire in the making of paper. Presumably they, too, find it wise to use the Eibel pitch. The paper makers in this country, who do not use the Eibel pitch, therefore, are few. It can hardly be that dividends on the shares of stock in the Eibel Company held by the five large companies would furnish motive enough for them to continue to be licensees, and to use something that was not of great advantage to them in their chief business of making of paper, and certainly no such motive would explain the action of the licensees, who are not stockholders, or that of the infringers, in continuing to use the Eibel pitch. It should be said that one of the large manufacturers of paper-making machinery called by the defendant said that since 1907 he had not installed a single machine without the Eibel pitch.

The fact that the Eibel pitch has thus been generally adopted in the paper-making business, and that the daily product in paper making has thus been increased at least 20 per cent. over that which had been achieved before Eibel, is very weighty evidence to sustain the presumption from his patent that what he discovered and invented was new and useful. Of course, although very persuasive, it is not conclusive, and may be explained. This brings us to the consideration of the evidence of the prior art, and the contention of the defendant and the conclusion of the court below, that the step taken by Eibel, so far as he took one, was a mere obvious application of fully developed devices in the prior art.

Eibel in his patent gives this measure of the prior art:

'The Fourdrinier wire has usually been arranged to move in a horizontal plane, a though I am aware that means have been provided for adjusting the breast roll and of the wire to different elevations usually below the level, to provide for running with different grades of [261 U.S. 45, 57] stock-as, for instance, with quick stock and slow stock; but so far as I am aware the making wire has always had to perform the work of drawing along the stock, and as the wire moved much faster than the stock the stock waved or rippled badly near the breast roll end of the wire, which gradually diminished until an equilibrium was established, and a smooth, even, glassy surface presented, and not until the waving or rippling ceased did the fibers lay down uniformly and produce a well-formed sheet of paper. The machine has been run necessarily at a slow rate of speed to give ample time for the water to escape and for the fibers to lay down, so as to make a uniform sheet, and in case the time was insufficient, the breast roll end of the wire has been lowered still further until the desired result was accomplished. In accordance with my invention I operate entirely above the level, to cause the stock to travel by gravity at a velocity approximately equal to the speed of the making wire, which I believe to be a new principle of operation.'

It is important that the stock, when it reaches the 'dandy' roll beyond the first suction box of the machine, shall be, on the one hand, free enough of water to be a formed sheet and take an impression from the dandy roll, and on the other that it shall not be so dry that it will not retain the impression. Paper of such a heavy composition of fiber and water that it holds water long is said to be 'slow stock.' Paper of lighter and thinner composition, parting with water easily and drying quickly, is called 'quick stock.' Various means were adopted to give the stock the proper degree of dryness at the dandy roll, usually by adjustment of the composition of the stock. What Eibel describes in this reference was another means. It was not widely used, however. It was a slight depression or elevation in the wire at the breast roll, so that slow stock could be made to run up hill from the flow box to the dandy roll, lengthening the time of [261 U.S. 45, 58] the movement, and thus giving more opportunity in its progress for the needed draining of the stock. On the other hand, fast or thin stock, from which the water flowed too easily, could be made to retain sufficient water by hastening its progress to the dandy roll by the downhill tilt of the wire. This tilt was obtained by raising the breast roll end of the wire, either by putting shimming blocks under that end of the machine or by special devices to be described. The sole object was greater or less drainage of stock for the dandy roll. The Eibel invention is distinguished from the prior art in two ways: First, in that the pitch of the wire was for a different purpose, to be accomplished, not at the dandy roll, some 20 or more feet from the breast roll, but at a point only 9 or 10 feet from there; and, second, by the fact that to achieve his purpose a high or substantial pitch must be given to the wire, while only a small or trivial pitch was needed for the drainage of the prior art. 1

This difference in purpose and degree of pitch between Eibel's device and the prior art is quite clearly shown by reference to a patent granted to Barrett and Horne, assignors to J. H. Horne & Sons, one of the important manufacturers of paper machinery of the country, in 1899. Their specifications showed a device capable of elevating the breast roll less than 3 inches, and its sole purpose was for drainage. Their specifications say: [261 U.S. 45, 59] 'In certain kinds of pulp, notably the wood pulp which is now

largely used in making paper, the water drains away very rapidly, so that the pulp may become nearly dry before it leaves the shake frame, and thus not be properly laid when it reaches the rollers. This tendency may be obviated to a considerable extent by downwardly inclining the shake frame toward the rollers, so that the water tends to travel along with the pulp, and will not, therefore, drain out through the wire so rapidly. It is further desirable that the amount of inclination or slope should be variable, so as to adapt the machine for pulp of different kinds or grades.'

The Bayliss Austin Machine, one of three chiefly relied on to show prior use, was made by the Horne Company and was designed by Barrett and Horne on the model of this patent. It is very clear, from an examination of the design and contract for this machine, that the pitch of the wire in it could not have exceeded 3 inches, and that it was used for drainage. Other patents were set up in defense; some of them showing devices for raising the breast roll and wire above the level, and lowering them below the level for the purpose of drainage. The angle of elevation and depression was always small. There was a constant straining by the witnesses for the defense to increase the elevation before Eibel. On the direct examination they began with a positive assertion that a pitch of 4, 5, and even 6 inches, had been used in certain machines before Eibel's time; but written records, contracts, and specifications brought out on cross-examination show nothing more than 3 inches provided for purpose of drainage, and not more than that was used. This is not to say that witnesses in the face of such records did not testify to a higher elevation; but in such cases the amount of elevation rested in memory running back more than 10 or 15 years, a memory stimulated by the subsequent high pitches of Eibel and the retrospect of the [261 U.S. 45, 60] progress that now seems so easy and clear to every one. There was, too, always indefiniteness as to when such increase in elevation of the wire had taken place, whether before or after August, 1906, Eibel's date, and there was no evidence of weight, we think, after a full examination of the record, sufficient to justify a finding that such elevations had ever exceeded 3 inches before his application.

This is confirmed by the fact that greater elevation was not needed for the purpose of drainage for which it was devised and used. It is true that some witnesses testify that they realized, before Eibel's application, that speeding up the stock to equal velocity with the wire would solve the difficulty and aid the speed. But there is not a single written record, letter, or specification of prior date to Eibel's application that discloses any such discovery by any one, or the use of the pitch of the wire to aid the speed of the machine. The oral evidence on this point falls far short of being enough to overcome the presumption of novelty from the granting of the patent. The temptation to remember in such cases and the ease with which honest witnesses can convince themselves after many years of having had a conception at the basis of a valuable patent, are well known in this branch of law, and have properly led to a rule that evidence to prove prior discovery must be clear and satisfactory. *Barbed Wire Patent Case*, 143 U.S. 275, 284, 12 S. Sup. Ct. 443; *Loom Co. v. Higgins*, 105 U.S. 580, 591. Indeed, when we consider the indisputable fact that Eibel's successful experiment at Rhineland and his application for a patent surprised the whole paper trade, and that for a short time many held back from risking so radical a change and then all adopted it, oral evidence that some persons had discovered the source of trouble and the means of remedying it some years before Eibel is incredible. We are confirmed in this conclusion by the finding of Judge Hale in the District Court, which is not [261 U.S. 45, 61] offset by the reversal of his decree in the Circuit Court of Appeals, because that court seems to have reached its conclusion chiefly on other grounds yet to be considered.

The defendant's counsel contend that the specifications of the Eibel patent require that the only force to be used in giving speed to the stock shall be the force of gravity created by the angle of down-hill inclination of the wire. They say that the patentee mentions no other means of acceleration, that he must be confined to this, and that a machine which uses other factors for this purpose does not infringe. We do not understand the Circuit Court of Appeals to go quite so far, but it does seem to give a construction requiring the force of gravity caused by the pitch of the wire to be the predominating cause of the increased speed of the stock. The factors of speed of the stock in such a machine, before the factor of

pitch was applied to increase it, were the head or hydraulic pressure of the stock in the flow box behind the slice, imparting movement to it as it came out onto the wire under the lifted slice, and the carrying effect of the moving wire upon the fluid stock as it fell upon the wire and proceeded gradually to form into a web as the fibers were laid and the water drained.

Many calculations were made by defendant's expert Carter, based on the laws of hydraulic pressure and flow, to show that, under varying conditions of head and pitch and the speed of the wire, the chief factor would be head, the next the 'drag' or carrying effect of the wire, and the least in degree and importance in making the velocity of the stock and the wire equal would be the pitch, and that Eibel's invention could not be present, because the 'drag' of the wire and its influence upon the speed of the stock must be eliminated under Eibel's specifications. We do not so understand it. As the stock descends upon the wire with the head of the flow box, it is thin and liquid, the wire at its greater speed necessarily imparts additional [261 U.S. 45, 62] speed to the stock, and in its unformed fluidity the added speed does not disturb or ripple the stock to the injury of the process of paper making. It is only after the stock proceeds a third or a half of the surface length of the wire that the point is reached where the overspeed of the drag becomes troublesome in the felting or formation of the web of the pulp. Before that point is reached, the 'drag' may be useful in bringing the speed of the stock nearer to that of the wire without injury. The truth seems to be, and this is brought out with force in the testimony of the defendant's expert witness Livermore, that while it is possible to calculate to a nicety the velocity of the free flowing liquid stock due to head and pitch, when unaffected by drainage, variation in viscosity and fluidity, and the like, yet, when these conditions are present, as they always are, and the other less calculable factor of the drag of the wire enters the problem, there is no means, short of actual experiment, to enable one to anticipate results, and it is quite impossible to apportion to each factor its real influence. This fact reflects on the question whether Eibel's discovery was invention rather than the mere obvious and simple application of known natural forces.

The defendant introduced expert evidence to show that with a head of 2 1/4 inches in the flow box and a speed of 585 feet to the minute in the wire, and excluding the factor of 'drag' of the wire, it would require an elevation of 48 inches to make up the difference in speed of the stock given by the head and the speed of the wire at a distance 10 feet from the point of discharge on the wire. The conclusion drawn from this seems to be that, as no practical machine uses 48 inches pitch, the Eibel invention has never been used or infringed. Disregarding its error in omitting necessary factors already adverted to, this reasoning seems to us to depend on too narrow a construction of the patent. [261 U.S. 45, 63] In administering the patent law, the court first looks into the art, to find what the real merit of the alleged discovery or invention is, and whether it has advanced the art substantially. If it has done so, then the court is liberal in its construction of the patent, to secure to the inventor the reward he deserves. If what he has done works only a slight step forward, and that which he says is a discovery is on the border line between mere mechanical change and real invention, then his patent, if sustained, will be given a narrow scope, and infringement will be found only in approximate copies of the new device. It is this differing attitude of the courts toward genuine discoveries and slight improvements that reconciles the sometimes apparently conflicting instances of construing specifications and the finding of equivalents in alleged infringements. In the case before us, for the reasons we have already reviewed, we think that Eibel made a very useful discovery, which has substantially advanced the art. His was not a pioneer patent, creating a new art; but a patent which is only an improvement on an old machine may be very meritorious, and entitled to liberal treatment. Indeed, when one notes the crude working of machines of famous pioneer inventions and discoveries, and compares them with the modern machines and processes exemplifying the principle of the pioneer discovery, one hesitates in the division of credit between the original inventor and the improvers, and certainly finds no reason to withhold from the really meritorious improver, the application of the rule 'ut res magis valeat quam pereat,' which has been sustained in so many cases in this court. *Winans v. Denmead*, 15 How. 338, 341; *Corning v. Burden*, 15 How. 265, 269; *Turrill v. Railroad Co.*, 1 Wall. 491, 510; *Rubber Co. v. Goodyear*, 9 Wall. 788, 795;

McClain v. Ortmyer, 141 U.S. 419, 425, 12 S. Sup. Ct. 76.

Eibel was an avowed improver, not in the art of paper making generally, but upon a well-known and universally [261 U.S. 45, 64] used machine. In that machine, the speed of the stock, which was the subject-matter of his improvement, had always been controlled by two factors, the head of the stock in the flow box, and the carrying effect of the under-moving wire. He says nothing in his specifications to exclude these factors; he merely adds another factor of speed to secure the equality of speed of the stock with the wire. He says:

'For the purpose of increasing the speed of the machine to the maximum I maintain the breast roll end of the making wire at a high elevation above the level, so that the stock travels by gravity much faster than the making wire ordinarily runs for a certain grade of stock, and I then increase the speed of the machine to such an extent as to bring the rate of the making wire up to the speed of the rapidly moving stock, and as a result the capacity of the machine is largely increased.'

We agree fully with Judge Hale in the District Court in his comment on this:

'The process invented by him [Eibel] begins to operate after the stock has entered upon the wire. His apparent attempt was to get rid of bubbles and wrinkles, before he got to the place on the machine where the paper is formed. To do this, he allowed gravity to work with 'drag' and with 'head.' He harnessed all the elements he could find. He brought gravity in with the other elements, and so brought the speed of the stock up to equality with that of the wire. By this means he achieved high speed and also freed the stock on the wire from waves and ripples.' 267 Fed. 855.

The Circuit Court of Appeals questions the assumption that gravity was a new factor with Eibel, because the head of the flow box is only another application of the force of gravity. This is a mere criticism of a term, which, whether accurate or not, is not misleading. What Eibel was dealing with in his patent as a new factor was the additional [261 U.S. 45, 65] force acquired by the pitch of the wire, and that he called gravity; and Judge Hale, in the passage quoted, uses the word with the same meaning, and without any confusion to the reader.

We think, then, that the Eibel patent is to be construed to cover a Fourdrinier machine in which the pitch of the wire is used as an appreciable factor, in addition to the factors of speed theretofore known in the machine, in bringing about an approximation to the equal velocity of the stock and the wire at the point where, but for such approximation, the injurious disturbance and ripples of the stock would be produced.

The next objection to the patent, which prevailed in the Circuit Court of Appeals, is that its terms are too vague, because the extent of the factor of pitch is not defined, except by the terms 'substantial' and 'high.' The figure accompanying the specification and illustrating the improvement indicates an angle of 4 per cent., or an elevation of 12 inches, and the reference to the small elevations for drainage shown in earlier devices indicated that the patentee had in mind elevations substantial as compared with them, in order to achieve his purpose of substantially increasing the speed of the stock. It was difficult for him to be more definite, due to the varying conditions of speed and stock existing in the operations of Fourdrinier machines and the necessary variation in the pitch to be used to accomplish the purpose of his invention. Indefiniteness is objectionable, because the patent does not disclose to the public how the discovery, if there is one, can be made useful, and how its infringement may be avoided. We do not think any such consequences are involved here. This patent and its specifications were manifested to readers who were skilled in the art of paper making and versed in the use of the Fourdrinier machine. The evidence discloses that one, so skilled, had no difficulty, [261 U.S. 45, 66] when his attention was

called to their importance, in fixing the place of the disturbance and ripples to be removed, or in determining what was the substantial pitch needed to equalize the speeds of the stock and wire at that place. The immediate and successful use of the pitch for this purpose by the owners of the then fastest machines and by the whole trade is convincing proof that one versed in paper making could find in Eibel's specifications all he needed to know, to avail himself of the invention. Expressions quite as indefinite as 'high' and 'substantial,' in describing an invention or discovery, in patent specifications and claims, have been recognized by this court as sufficient. In *Tilghman v. Proctor*, 102 U.S. 707, the claim sustained was for 'the manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure.' See, also, *Rubber Co. v. Goodyear*, 9 Wall. 788, 794; *Mowry v. Whitney*, 14 Wall. 620, 629; *Lawther v. Hamilton*, 124 U.S. 1, 9, 8 S. Sup. Ct. 342; *Carnegie Steel Co. v. Cambria Iron Co.*, 185 U.S. 403, 436, 22 S. Sup. Ct. 698; *Abercrombie & Fitch Co. v. Baldwin*, 245 U.S. 198, 205, 38 S. Sup. Ct. 104.

It is contended on behalf of the defendant that, whether Barrett and Horne perceived the advantage of speeding up the stock to an equality with the wire, yet the necessary effect of their devices was to achieve that result, and therefore their machine anticipated Eibel. In the first place, we find no evidence that any pitch of the wire, used before Eibel, had brought about such a result as that sought by him, and, in the second place, if it had done so under unusual conditions, accidental results, not intended and not appreciated, do not constitute anticipation. *Tilghman v. Proctor*, 102 U.S. 707, 711; *Pittsburgh Reduction Co. v. Cowles Electric Co. (C. C.)* 55 Fed. 301, 307; *Andrews v. Carman*, 13 Blatchford, 307, 323, Fed. Cas. No. 371.

It is next objected that the alleged invention covers only a matter of degree in pitch, which cannot be the subject of a patent. The prior art showed the application [261 U.S. 45, 67] of gravity by use of the pitch of the wire to the improvement of the Fourdrinier machine, and Eibel, it is said, merely increased degree of pitch and gravity for the same general purpose. We think this attack upon the patent cannot prevail. Eibel's high or substantial pitch was directed toward a wholly different object from that of the prior art. He was seeking thereby to remove the disturbance and ripples in the formation of the stock about 10 feet from the discharge, while the slight pitches of the prior art were planned to overcome the dryness in the formed web of the stock at double the distance from the discharge. It would seem that the greater speed of the stock produced by Eibel would make difficult the joint application of the principles of Eibel and Barrett and Horne, and that the function of adjusting the drainage for the dandy roll must be carried on by some of the other methods known to the art when Eibel's pitch is used. But, however this may be, the object of the one was entirely different from that of the other. Livermore, an expert witness called by the defendant, when asked the question whether the purpose of the Barrett and Horne patent had anything in common with the theory of the Eibel patent answered:

'I should say not. It looks to me as if Barrett and Horne referred to the adjustment of inclination with one effect in mind, and that Eibel referred to like adjustment with another effect in mind. ... In this particular case, the two effects have, so far as I can see, no special correlation to one another, and an adjustment made with one effect in mind might or might not produce a desirable effect as to the other function or phenomenon.'

In considering this phase of the controversy, we must not lose sight of the fact that one essential part of Eibel's discovery was that the trouble causing the defective paper product under high machine speed was in the disturbance and ripples some 10 feet from the discharge, and that [261 U.S. 45, 68] they were due to the unequal speeds of stock and wire at that point and could be removed by equalizing the speeds. The invention was not the mere use of a high or substantial pitch to remedy a known source of trouble. It was the discovery of the source not before known, and the application of the remedy, for which Eibel was entitled to be rewarded in his patent. Had the trouble which Eibel sought to remedy

been the well-known difficulty of too great wetness or dryness of the web at the dandy roll, and had he found that a higher rather than a lower pitch would do that work better, a patent for this improvement might well have been attacked on the ground that he was seeking monopoly for a mere matter of degree. But that is not this case. On the other hand, if all knew that the source of the trouble Eibel was seeking to remedy was where he found it to be, and also knew that increased speed of the stock would remedy it, doubtless it would not have been invention on his part to use the pitch of the wire to increase the speed of the stock, when such pitch had been used before to do the same thing, although for a different purpose and in less degree. We cannot agree with the Circuit Court of Appeals that the causal connection between the unequal speeds of the stock and the wire, and the disturbance and rippling of the stock, and between the latter and the defective quality of the paper in high speeds of the machine, was so obvious that perception of it did not involve discovery which will support a patent. The fact that in a decade of an eager quest for higher speeds this important chain of circumstances had escaped observation, the fact that no one had applied a remedy for the consequent trouble until Eibel, and the final fact that, when he made known his discovery, all adopted his remedy, leave no doubt in our minds that what he saw and did was not obvious, and involve discovery and invention.

The Circuit Court of Appeals dwells on the fact that the use of the pitch of wire was not really the introduction [261 U.S. 45, 69] of a new factor in the solution of the problem, because the same result would have followed if the head of the flow box had been made greater, in order increase by gravity the speed of the stock. Doubtless this could have been done. There were difficulties, however, in such a method, when Eibel's application was filed, because in the then machines the flow box as supported by an apron over the wire, and the necessary addition to the weight of the stock in the flow box, in increasing the head. Would have interfered with the free working of the wire. Since that time an improvement has been adopted, by which the flow box does not rest on the wire, and additional head can be imparted to the stock. The defendant invites attention to the fact that one or two paper makers are increasing this head and giving up the pitch, for the purpose of increasing the speed of the stock. We do not see that these circumstances in any way affect the validity of the Eibel patent. If defendant or others can do what Eibel accomplished in another way, and by means he did not include in his specifications and claims, i. e., by additional head and the abandonment of a substantial pitch, they are at liberty to do so and avoid infringement.

We come finally to the question of infringement. If the Eibel patent is to be construed as we have construed it, there can be no doubt that the defendant uses the Eibel invention. The device which the defendant uses for tilting the wire-i. e., by shimming blocks-and that for regulating and increasing the speed of the wire are plainly equivalents of the same elements in the new combination, which Eibel shows in his drawings and specifications. The defendant uses a Fourdrinier machine having the breast roll end of the paper-making wire maintained at an elevation of 15 inches above the level whereby the stock is caused to travel by gravity rapidly in the direction of the movement of the wire, and at a speed approximately [261 U.S. 45, 70] equal to the speed of the wire substantially as described. This brings the defendant's machines within the first claim of the patent, if 15 inches is a substantial elevation of the making wire, as all the witnesses concede that it is. The same conclusion must be reached as to the second claim, because the defendant uses a machine 'having the breast roll end of the paper making wire maintained at a high elevation, whereby the stock is caused to travel by gravity faster than the normal speed of the wire for a certain grade of stock, and having means for increasing the speed of the machine to cause the wire to travel at substantially the same rate of speed as the rapidly moving stock, substantially as described.' The same thing is true of the third claim.

Question has been made whether these three claims are for a machine or a process. We think they are claims for a machine, i. e., for an improvement on a machine, and that the devices for such improvement, to wit, the elevation by a screw or other equivalent method, and the control of the speed of the wire, are shown by the specifications and the figures, together with a sufficient description of

their operation.

The seventh and eighth claims are for the same improvement, with the suction boxes changed from their usual position in the unimproved machine, to make them effectively function on the pitched wire. They are machine claims, and are infringed by the defendant. Their new adjustment is part of a new combination, and the words 'substantially as described' limit them to a combination including the elements included in the first three claims.

Claim No. 12 is as follows:

'12. In a Fourdrinier machine, a downwardly moving paper-making wire, the declination and speed of which are so regulated that the velocity of the stock down the declining wire, caused by gravity, is so related to the [261 U.S. 45, 71] velocity of the wire in the same direction that waves and ripples on the stock are substantially avoided and the fibers deposited with substantial uniformity on the wire, substantially as described.'

This comes nearer to being a process claim, but, whether it is or not, the defendant infringes it.

The evidence discloses that, after the suit was brought, the defendant reduced the pitch of one of its machines to 6 inches, and the contention of defendant is that the machine ran as well and gave as good results as when its pitch was 15 inches. We are not called upon to decide whether this contention can be sustained, because the reduction was after the bill was filed. It may be noted, however, that the admissions of witnesses seem to show that this reduction was made for purposes of the suit, and that, immediately after the defendant won the suit in the Circuit Court of Appeals, it restored the pitch of this machine to 15 inches, and, when the decree of the Circuit Court of Appeals proved not to be final, the wire was lowered again to a 6-inch pitch. Much evidence was taken, and much discussion has followed, upon the point whether a 6-inch pitch, accomplishing in whole or in part what Eibel sought to do, would infringe a patent for a substantial pitch. We do not find it necessary to pass definitely on the question, because it is not before us on the record, though we cannot prevent the natural inferences upon this point to be drawn from the conclusions we have reached.

The decree of the Circuit Court of Appeals, dismissing the bill, is reversed, and the decree of the District Court is affirmed.

Footnotes

[[Footnote 1](#)] It is true that defendant's expert, Carter, points out that in some of the machines of the prior art, in which means were provided for tilting up the wire, the tilting was confined to that part of the surface length covered by the shake frame, say 18 feet, and did not extend to the first suction box; whereas, Eibel's tilting involved the entire surface length of 30 feet. It would follow from this that the elevation of 3 inches in such machines would mean a greater angle of declination than 3 inches for the full surface length and that the disparity between 3 inches and 12 inches was not so great as the figures would lead one to think. But, whatever difference this might make, the fact remains that Eibel's pitch was substantially greater than anything in the prior art.